

**APPARATUS FOR ILLUMINATING A PORTABLE ELECTRONIC
OR COMPUTING DEVICE THROUGH A PLUG-IN CONNECTION
TO A UTILITY POWER JACK**

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This is a continuation-in-part of U.S. patent application Ser. No. 09/330,322,
attorney docket number 241/057, filed June 11, 1999 and ^{now US Pat. No. 6,186,636} ~~currently pending, the~~

~~specification of which is incorporated herein by reference.~~ This application claims

priority to Serial No. 09/330,322 under 35 U.S.C. §120.

Field of the Invention

The present invention is in the field of lighting devices for portable electronic or
computing devices.

Background of the Invention

Compact electronic devices with a viewing screen or keypads have become very
common and quite popular. Such devices have been popular for a number of years in
connection with hand-held, portable, battery-powered gaming devices. A well-known
example of such a device, that has sold millions of units, is the GAME BOY® device
sold by Nintendo. More recently, other electronic devices have also included viewing
screens, such as portable video cameras and cellular phones. And, of course, portable
computers have long had viewing screens. Although the complexity and cost of such
devices can vary greatly, it is common for such devices to use a generally flat, liquid
crystal display screen.

Flat, liquid crystal display screens work very well in a well-lit area. However, when such devices are used in dimly lit areas, or at night, it can be difficult, if not impossible, for a user to see anything in the viewing screen. This problem is magnified when such a screen is used in a device that is meant to be portable, and especially

5 when it is a small device.

If a portable device is sufficiently complex, and generally more expensive, such as a portable laptop computer, the device can include lighting within the actual device.

An example of such lighting is a portable laptop computer with a backlit screen.

However, this solution is not always economically practical, nor does it necessarily solve the problem in smaller devices. Also, if an electronic device does not have a viewing screen, then this option is not even available.

To solve this problem, especially in connection with hand-held, portable, battery-powered gaming devices, a number of different solutions have been proposed. Such solutions have typically included add-on devices with their own source of electrical power. These devices can be designed to fit onto the electronic device or be designed for use in connection with the electronic device. However, because such devices use their own source of electrical power, they tend to be rather bulky and heavy. In addition, the second source of electrical power increases cost and creates the possibility of another source of power failure.

Accordingly, there is a long felt need for a simple, economical, device that can illuminate portable electronic or computing devices without the drawbacks associated with prior illumination devices.

SUMMARY OF THE INVENTION

The present invention is generally directed to an apparatus for illuminating a portable electronic device that plugs into the electronic device and is powered by the power source of the electrical device through an electronic connection to a utility power jack of the electronic device. The present invention is also generally directed to an apparatus for illuminating a portable computing device with a display screen that plugs into the computing device and is powered by the power source of the computing device through an electronic connection to a utility port in connection with a power source.

In a first, separate aspect of the present invention, the illumination device can be controlled by a dimmer. The illumination device can use a light emitting diode and a white light diode is especially preferred.

In another, separate aspect of the present invention, the illumination apparatus includes a plug that has a second utility power jack or port adapted to receive a second plug that is in electrical communication with the utility power jack or port. The plug contains one or more support wings. These support wings can be used to prevent movement of the body in a certain direction, especially when they are located on opposite ends of the plug.

In still another, separate aspect of the present invention, the illumination apparatus can include a flexible arm. This flexible arm can be adjusted as to adjust the height or angle of the illumination device relative to the portable electronic or computing device. In addition, other devices, such as a diffuser, a magnifier, a reflector, a dimmer,

or a regulator for varying the intensity of light, can also be added to the illumination apparatus.

Accordingly, it is a primary object of the present invention to provide a low-cost, practical and improved illumination apparatus for a portable electronic device that is
5 powered by a utility jack of the electronic device.

It is also a primary object of the present invention to provide a low-cost, practical and improved illumination apparatus for a portable computing device that is powered by a utility port of the computing device.

This and further objects and advantages will be apparent to those skilled in the art in connection with the drawing and the detailed description of the preferred embodiment set forth below.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic representation of a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Figure 1 illustrates how a preferred embodiment of the present invention can be
20 used with a portable electronic game device, such as a GAME BOY® device. Although this drawing depicts a portable electronic game device, the invention is adaptable to any portable electronic device that has a utility power jack in electrical connection with a power source, such as a cellular phone or a video camera.

In the preferred embodiment shown in Figure 1, the electronic device 1 has a viewing screen 2, a power source and a utility power jack. The power source and utility power jacks are not visible and are shown generally as 3 and 4, because their location and configuration will vary depending upon the design of a given portable electronic device. The power source 3 may be self-contained, such as batteries in a battery compartment. The power source 3 may or may not be augmented by a plug-in capability to a non-portable power source, such as a wall outlet.

The illumination apparatus, shown generally as 5, includes a plug, shown generally as 6, for plugging the illumination apparatus 5 into the utility power jack 4 of the electronic device 1. The exact configuration of the plug 6 should be designed so as to mate with the utility power jack 4 and create a mechanical and electrical connection between the utility power jack 4 and the plug 6 when the apparatus 5 is plugged into the electronic device 1.

The illumination apparatus 5 also includes a body 7 and an illumination device 8. The body 7 connects the illumination device 8 to the plug 6, and the body is preferably comprised of a flexible arm. The illumination device 8 is electrically connected to the utility power jack 4 through the plug 6 and the body 7 so that the illumination device 8 is powered by the power source 2 when the illumination apparatus 5 is plugged into the electronic device 1. The electrical connection between the illumination device 8 and the plug 6 can be by any suitable means, such as by a wire (not shown). It is especially preferred that the body 7 can be adjusted, when the apparatus 5 is plugged into the utility power jack 4, to adjust the height and/or the angle of the illumination device 8 relative to the electronic device 1. In order to prevent the movement of the apparatus in

a direction away from the electronic device, it is especially preferred to attach one or more support wings 16 to the plug 6. These support wings 16 stabilize the plug 6 by providing surfaces that abut the electronic device 1 and thereby prevent rocking of the plug 6 in a plane of the support wings 16. They also make it less likely that the plug 6 will pull away from the electronic device 1 at the location of the support wings 16, thereby stabilizing the connection of the plug 6 to the electronic device 1.

In the preferred embodiment of the present invention, the illumination device 8 is comprised of a light emitting diode ("LED") 9 housed in a case housing 10. The housing 10 can also include suitable electronics, such as a resistor 11, or a regulator (not shown) for varying the intensity of light given off by the LED. In an especially preferred embodiment, the LED 9 is a white light diode. The housing can also include additional features, such as a diffuser 14. The diffuser 14 can alternatively be replaced by a magnifier 14. Another additional feature that may be included is a reflector 13. The reflector 13 helps to concentrate light toward the object to be illuminated while also helping to minimize back-scatter of light generated by the illumination device. The reflector includes a mirrored surface on the bottom of the reflector for reflecting light away from the user. The housing 10 can also include an opaque surface at its end distant from the desired travel of light so as to minimize undesirable back-scatter of light toward a user's eye. It is especially preferred that the housing 10 include a dimmer 15. The dimmer 15 can be a variable resistor, or a potentiometer, connected to a user control, such as a dial.

When the plug 6 of the illumination apparatus 5 is plugged into the utility power jack 4 of the electronic device 1, it necessarily occupies the connection that the utility

power jack 4 would otherwise provide to a user of the electronic device 1. Because a user of the electronic device 1 might need to connect some other device to the utility power jack 4, it is especially preferred that the plug 6 be constructed so as to include a second utility power jack 12. The second utility power jack 12 is adapted to receive a second plug and provide a mechanical and electrical connection for the second plug equivalent to that which is provided by the utility power jack 4. Thus, the second utility power jack 12 will provide electrical communication for the second plug with the utility power jack 4 when the second plug is plugged into the plug 6 and the plug 6 is plugged into the utility power jack 4.

The present invention is also adaptable to a portable computing device with a display screen that is not illuminated by the portable computing device. In such an embodiment, the illumination apparatus is plugged into a utility port of the computing device in electrical connection with a power source instead of the utility power jack 4 of the electronic device 1. In such a device, the utility port can be any port that allows connection of additional products or communication devices, or cables, or any additional accessory or product. The illumination apparatus can have a second utility port adapted to receive a second plug that is in electrical communication with the utility port when the second plug is plugged into the plug and the plug is plugged into the utility port. In all other respects, the structure and function of the illumination apparatus would be the same as for the illumination apparatus 5 described above in connection with electronic device 1.

It will be readily apparent to those skilled in the art that still further changes and modifications in the actual concepts described herein can readily be made without departing from the spirit and scope of the invention as defined by the following claims.

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